

REMARKS

Claims 1-6 are present in this application. Claims 1 and 2 are independent.

Claim Objections

Claims 5 and 6 are objected to. Accordingly, claims 5 and 6 have been amended. Applicant requests that the objection be withdrawn.

Claim Rejection under 35 USC 103 – Dong, Gweon

Claim 1 has been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,923,427 (Dong; newly cited) in view of U.S. Patent 6,563,098 (Gweon; newly cited).

Applicant traverses this rejection.

The Office Action states that Dong discloses all of the features of the claimed invention except for at least one slit for narrowing at least one light beam projected toward at least one of the distance measurement targets, and said at least one slit for narrowing at least a portion of the light reflected from the at least one of the distance measurement targets. The Office Action instead relies on Gweon for making up for this deficiency. In particular, the Office Action alleges that Gweon's slit 24a teaches the claimed slits.

Gweon is directed to a displacement measurement device that relies on focusing of the unit displacement center. In the case where the light beam has been accurately focused on the slit 24a, the maximum amount of light is present before the opening of the slit 24a. In other cases, light beams go out of focus and are rapidly dissipated (Gweon at col. 4, lines 27-31). Thus, the slit 24a serves to maximize the sensitivity of the focus displacement. Dong's triangulation-type

distance sensing system seeks to maintain the intensity of light emitted from an LED to compensate for changes in light intensity due to changes in distance from and reflectivity of the target. Dong's system does not use focus as its means for determining a distance. Thus, Applicant submits that Dong's triangulation-type distance sensing system would not benefit from Gweon's focusing-type displacement measurement system. In other words, Applicant submits that one of ordinary skill in the art would not be motivated to combine Dong's triangulation-type distance sensing system and Gweon's focusing-type displacement measurement system in a manner of the claimed invention.

The invention of claim 1 permits a choice of distance between one of two slits (i.e., the one for narrowing the light projected to the distance measurement target) and the light-receiving element. In Gweon, the slit 24a is not for purposes of miniaturization of the device but for adjustment of sensitivity. In any case, Gweon discloses only a single slit 24a.

In order to clarify these distinctions, claim 1 has been amended to indicate that the two slits (i.e., one for the projected light beam and one for the reflected light beam) are independent from each other. Applicant submits that Dong and Gweon, either alone or in combination, fails to teach each and every feature of claim 1 as amended.

Applicant requests that the rejection be reconsidered and withdrawn.

Claim Rejection under 35 USC 103 – Dong, Laib

Claim 2 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Dong in view of U.S. Patent 4,373,816 (Laib; newly cited). Applicant traverses this rejection.

The Office Action states that Dong discloses all features of the claimed invention except for at least one slit for narrowing at least one light beam projected toward at least one of the distance measurement targets. The Office Action instead relies on Laib for making up for this deficiency. The Office Action alleges that Laib's slit 108 teaches the claimed at least one slit.

Laib is directed to a position determining apparatus for determining the displacement between a target surface and a reference location over a field of view. A projection lens projects a plurality of rays 109 in parallel toward a target surface 112 in order to determine a distance to a predetermined location (Laib at col. 10, lines 32-36). In order to form the plurality of rays 109, as well as to use just a single projection lens, Laib's apparatus can include a telecentric aperture/slit 108. The slit is telecentric because it is located at the focal point produced by a relay lens 106 that is half the distance to the light source 102 (Fig. 6; col. 10, lines 14-22). Because the slit is located at the focal point, reducing the size, i.e., narrowing, of the slit, results in an increase in the field of view of the image produced by the light source (col. 10, lines 37-44).

Furthermore, Dong and Laib disclose completely different devices. Unlike Dong, Laib's device is not used for measuring a distance to an object. Instead, Laib's device measures a positional difference between a target surface and a reference location. Dong, on the other hand, is directed to a distance sensing system.

The Office Action does not particularly point out a teaching for the claimed "light collecting element."

In the present invention, the slit 14 is long in a direction perpendicular to the long direction of the light-receiving element 12 (para. 0033). The spot formed on the light receiving element is thus formed in a direction perpendicular to the long direction. This enables flexibility

in positioning of the light-receiving element, and a reduction in the width of the light receiving surface.

To the contrary, the slit 108 of Laib is parallel to apertures 125, and not perpendicular to the long direction of the light-receiving element. Furthermore, Laib does not disclose a light collecting element for collecting reflected light.

Thus, Applicant submits that Laib fails to teach each and every claimed element of claim 2. Applicant requests that the rejection be reconsidered and withdrawn.

Claim Rejection under 35 USC 103 – Dong, Gweon, Reichard

Claim 4

Claim 4 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Dong in view of Gweon, and further in view of U.S. Patent 3,740,563 (Reichard). Applicant traverses this rejection.

The same arguments as in the above for claim 1 apply as well to claim 4. At least for the reasons above for claim 1, Applicant submits that the rejection fails to establish *prima facie* obviousness for claim 4.

Claim 4 is directed to the arrangement of claim 1 and the further feature of a filter arranged at an exit side of at least one of the slits narrowing at least one of the light beams projected toward at least one of the distance measurement targets, and the at least one filter being arranged at the incident side of said at least one of the slits narrowing at least a portion of the light reflected from at least one of the distance measurement targets.

The Office Action relies on Reichard for teaching the filters recited in claim 4. The Office Action states that Reichard teaches that it is known in the art to provide at least one filter (31 of Fig. 1A) being arranged at an exit side of at least one slit (34 of figure 1A) for narrowing the at least one of the light beams projected toward at least one of the distance measurement targets. As a motivation, the Office Action provides that the combination would have been obvious “for the purpose of filtering or reducing noise [in a] light system.” (words added for clarity) Applicant disagrees.

First of all, Reichard discloses an electroptical system for controlling the diameter of crystals pulled from a melt. Reichard does not disclose any type of displacement sensor. Thus, Applicant submits that Reichard is not analogous prior art. In addition, Reichard’s system for controlling the diameter of pulled crystals is not pertinent to the particular problem with which the present inventor is concerned. See M.P.E.P. § 2141.01(a).

Second, the filters disclosed in Reichard are “heat-reflecting optical filters” 31a and 31b, which preferentially block most of the longer-wavelength infrared radiation from the hot melt, crucible, and susceptor, in order to shield the optics chamber 17 from excessive heat and also discriminate preferentially in favor of the shorter wavelength tungsten-filament bulb illumination spectrum (col. 7, lines 4-11). Applicants submit that one of ordinary skill would not look to combine such heat-reflecting optical filters with the displacement sensor of Miyoshi, as well as the disclosed prior art.

Third, the optical filters 31a and 31b of Reichard, being for blocking infrared radiation, are not of the type for filtering or reducing noise, as alleged in the Office Action.

In embodiments of the present invention, filters serve to prevent the operation of the sensor from being impaired by dust entering the sensor interior through the slits. This feature is clarified in the claim as amended, which recites that the filters are in contact with a surface of the optical displacement sensor having respective slits. Reichard's optical filters do not filter dust.

Accordingly, Applicant submits that insufficient evidence of a motivation to combine Reichard is present and the rejection fails to establish *prima facie* obviousness for claim 4. Applicant requests that the rejection be reconsidered and withdrawn.

Claim Rejection – 35 U.S.C. § 103; Dong, Laib, Ikari

Claim 3

Claim 3 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Dong, Laib, and further in view of U.S. Patent No. 4,864,147 (Ikari). Applicant traverses this rejection.

The rejection of claim 3 relies on Ikari for teaching the claimed cylindrical lens. However, the same differences over Dong and Laib as in claim 2 apply as well to claim 3. Applicant requests reconsideration and withdrawal of the rejection.

Claim Rejection – 35 U.S.C. § 103; Dong, Laib, Ikari, Reichard

Claims 5 and 6

Claims 5 and 6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Dong, Laib, Ikari and Reichard. Applicant traverses this rejection.

The same arguments as in the above for claim 2 apply as well to claims 5 and 6. At least for the reasons above for claim 2, Applicant submits that the rejection fails to establish *prima facie* obviousness for claims 5 and 6.

Claim 5 is directed to the arrangement of claim 2 and the further feature of a filter arranged at an exit side of at least one of the slits narrowing at least one of the light beams projected toward at least one of the distance measurement targets. Claim 6 is directed to the same further feature in the arrangement of claim 3.

The Office Action relies on Reichard for teaching the filters recited in claims 5 and 6. The Office Action states that Reichard teaches that it is known in the art to provide at least one filter (31 of Fig. 1A) being arranged at an exit side of at least one slit (34 of figure 1A) for narrowing the at least of the light beams projected toward at least one of the distance measurement targets. As a motivation, the Office Action provides that the combination would have been obvious “for the purpose of filtering or reducing noise [in a] light system.” (words added for clarity) Applicant disagrees.

The same arguments as above for claim 4 applies as well to claims 5 and 6.

Accordingly, Applicant submits that insufficient evidence of a motivation to combine Reichard is present and the rejection fails to establish *prima facie* obviousness for claims 5 and 6. Applicant requests that the rejection be reconsidered and withdrawn.

CONCLUSION

Should the Examiner have any questions regarding this matter, she is respectfully requested to contact Robert W. Downs (Reg. No. 48,222), who may be reached in the Washington, DC, area at (703) 205-8000.

If necessary, the Commissioner is hereby authorized in this concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

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Respectfully submitted,

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